FOR MYSORE STATE

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Development (1948) Department.

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G.O. No. 4124

Dated 9 3 48

[Despatch Abstract.]

AGRICULTURAL - Indian Council of Agricultural Research
Scheme for the establishment of Bee Research Station:
Forwarded.

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

SCHEME FOR THE ESTABLISHMENT OF REGIONAL BEE-RESEARCH STATIONS.

1. INTRODUCTION: - Honey has been in use in India both as a food as well as a medicine from the very early days, and the needs of the country have been met from the local supplies only. The main source of the bulk quantities has been the Rock Bee (Apis dorsata). The crude and unclean methods of extraction of the honey, its improper preservation and sometimes the deliberate adulteration are too well known to deserve any special mention here. Improved methods of bee-keeping were planned and attempted in India about four a decades ago by one or two amateurs as well as by the then imperial Entomologist, Pusa. The habits of the indigenous species of honey bees were investigated and it was found that only the Indian bee (Apis indica F) was suitable for domestication. A few colonies of the European bee also (Apis mellifica F) appear to have been tried but with no success. In South India the Jesuit Fathers at Trichinopoly were the poineers in the trials with the Indian bee and some encouraging results have been recorded by them by 1916. Except for the enthusiasm of these amateurs, little or no interest was evinced by the public till the phenomenal depression days of 1930. Rural uplift, improving the standard of living and finding out ways and means of providing sufficient occupation for the ryot during the off-season, etc., were the main cry of the day. Bee-keeping was considered to be one of the profitable cottage industries. Government agencies as well as a few missionary and philanthropic organizations evinced an extraordinary zeal in giving a fillip towards the popularizing of this industry. The efforts were not in vain. The industry was very well received by the public and remarkable strides were made in its spread-there being over 10,000 hives in this presidency, maintained by mostly private enthusiasts. By about 1940 with the outbreak of the war, there was a deterioration in the progress, probably due to the want of spoon feeding by the organizing agencies and partly to the high prices of agricultural produce and other easier methods of making money. With all this, the demand for pure honey has been on the increase and sometimes even fancy prices up to Rs. 5 per pound were offered.

II. NEED FOR RESEARCH:--Now with the return of normal conditions and attainment of the long cherished independence of the country, our motto should be to keep pace with the other countries in all lines of developments. It is needless to add here that bee-keeping is one of the main Agro-industries of the Western countries and remarkable progress has been made in this direction. India is a country of unlimited agricultural and forest wealth and as such there is always bountiful supply of bee-pasturage. The work of the previous two decades on the Indian bee has helped us to gauge its potentialities and limitations under the existing conditions and the future line of work would, therefore, lie in the augmentation of the present knowledge with the help of the up-to-date methods of breeding, hybridization, with better varieties, etc. Too much stress on the urgent need for further research is hardly necessary here, as the following few aspects would indicate:--

(1) The Public are fast realizing the medicinal and food value of honey and the demand for the genuine stuff is on the increase.

(2) The country is not self-sufficient in the supply of this material in spite of the existence of the unlimited natural resources.

(3) There is enough evidence to show that we have still to depend on foreign countries even for this material.

(4) Past work indicates a bright future for the industry and enough natural facilities exist in the country.

(5) The industry would provide an ideal and profitable side line to the ryot and thus augment the scanty income from agriculture.

(6) The indirect benefit which accrues and goes to enrich the country's resources by means of cross-polination by bees is invaluable.

(7) Quantities of Pollen and nectar present in the flowers of most trees and plants are at present going to waste and bees are the only agents which are capable of collecting these materials and make them available for man's use.

III. WORK DONE;-- Considerable amount of spade work has already been done on Apis indica at Coimbatore. The knowledge and experience on hand is quite adequate to run an apiary of this been successfully and a short resume of the salient features of the aspects worked out is given below:-

A. Research- (a) General habits of bees.-(1) Breeding and swarming seasons, (2) Life history of the three different members, (3) their longivity, (4) Egg-laying capacity of the queen, (5) Range of flight, (6) Response of the bees to the weather and (7) Individual pollen-bearing capacity.etc.

(b) Management - (1) Hiving technique, (2) Building up the strength of colonies, (3) Swarming and its control, (4) Dividing, (5) Uniting (6) Queen-rearing and (7) Queen Introduction etc.

(c) Pasturage. - A fairly exhaustive list of the nectar and pollen-yielding flora of this Presidency with details regarding the months of flowering, status as bee-pasturage crops, time of visit by the bees, etc., has been compiled.

(d) Enemies - The important bee enemies of this Presidency have been studied. The most destructive of these is the wax moth-Galleria mellonella. Efficient, cheap and simple control methods have been evolved and are being advocated.

(e) Appliances - Suitable appliances such as honey extractors, drone and queen traps, queen excluders, bee-escaps, comb foundation sheets, etc., were either devised or adapted and these are exceedingly popular with the public.

(f) Honey - (1) Chemical analysis of a few samples were made Methods of proper ripening, storage, artifical granulation, etc., were adopted.

(2) Enormous quantities of honey are collected from the forests from the combs of the Rock Bee, Apis dorsutta. The methods of extraction and preservation were rather crude with the result the honey deteriorated in quality during storage. The problem was worked out thoroughly. Appliances for the hygienic extraction and methods of ripening and proper preservation of honey were devised. These methods are reported to be successfully practised in one or two centres of the Forest Department.

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B. Bee Propaganda - The industry is being popularised by the issue and distribution of comprehensive publications - priced as well as free in English and in the different vernaculars Arrangements are made for the supply of appliances at moderate rates. Training is given in the subject to interested parties. Exhibits regarding bee-keeping always form an attractive feature in most of the exhibitions and fairs.

With so much work at our credit, it is quite opportune that proposals for a further intensive study of the subject are on the move. A gist of the proposed items of wrok is given below. If the scheme is sanctioned and worked for the time stipulated, I feel that almost the last word can be said on the subject by about the termination of the period.

IV. Future Work - The proposed lines of research are enumerated below:-

A(1) The Indian bee - Apis indica - Classification - The only two distinct varieties of Apis indica F that occur in South India are the plains and hill varieties. Specimens, of these two categories were sent to the Imperial Bureau of Entomology sometime back and both of them were identified, as Apis indica F. On this authority, the two varieties may be ascribed only as two biological races. The apparent distinguishin features between the two are that the hill bees and their queen are darker in colour and slightly bigger in size in their natural habit. From the preliminary trails made at Coimbatore the bigger size and the colour of the Workers appear to mellow down to those of the plains bees in the course of one or two years, while the dark colour of the queen alone persists. The change in the colour and the size of the workers may be due to the exposure to the local weather conditions and in the case of the queen, the persistence of her colour may be due to her remaining indoors all her lifetime. There are a few other points of difference in their habits, temper, foraging and breeding capacities, etc., but these factors may not afford sufficient scientific evidence to warrant; their classification into different varieties or strains. A more reliable index would be the study of the biometric characters regarding the tongue length, leg length, sizes of wings, and cubital cells, their brood cells, etc. Bees from different localities of the plains as well as the hills may be collected and studied for these details. Attempts may also be made to correlate these factors with the working capacity of the bees.

(2) Breeding and selection - Colonies with desirable traits like mild temper, non-swarming propensity, good honey gathering capacity, etc., can be isolated and bred for desirable qualities. This work will be continued both with the hill and plains bees.

(3) Acclamatization of the hill bees on the plains - These bees are better breeders and honey-gatherers in their natural haunts, which may probably be due to the more favourable local climatic and pasturage conditions. Trails will be made to transport a few colonies of these bees and study their behaviour on the plains.

(4) Swarming and its control - This has been and still is a real head-ache even in Westerern countries where bee-keeping has been prefected as a fine art. Some palliative methods have been devised and found fairly effective. The Indian bee is notorious for its swarming propensities and until and unless definite methods to curb this undesirable instinct are devised, domestication of the Indian been cannot be said to be perfect.

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B. The foreign bees - (1) Apis mellifica - The bee is reputed to give phenomenal honey yields in the temperate regions. A number of attempts have been made to import this species and acclamatize it in India for the past three or four decades and no case of any success is on record so far. I am personally somewhat seeptic regarding their thriving properly under Indian conditions, but the trials are worth taki up in view of the enormous possibilities, in case the attempts are successful. Care should however, be taken to import colonies free from infectious diseases and only from places having similar climatic and pasturage conditions as those south India. America and Australia will be the sources to be tried. The behaviour of the colonies may be observed both on the hills as well as on the plains. A very careful eye will be kept on their progress and causes for their success or failure in this country worked out.

(2) Besides, the European bee, the indigenous honey bee of Egypt - Apis fasiata - is also said be a very good honey-gatherer. If possible, a few colonies of these also will be imported and tried, since the climatic and weather conditions of this country may perhaps be more similar, if not more adverse, than those prevalent in India. Other species from near about the tropies may also be imported if their performances are reported to be better

(3) Artificial insemination - Attempts will be made to effect a cross-between the foreign bee and the Indian bee under controlled conditions and evolve a better strain. Owing to the peculiar mating habits of the queen, ordinary methods of crossing are not feasible. They have, therefore, to be restricted to artificial insemination, which is by itself special art, requiring high skill and competence.

(2) Observations made, so far, show that individual colonies of Apis indica refuse to increase beyond a certain limit, irrespective of the condition and environments. Taking the population of the hive as the 'index' of the future performance, trails will be conducted to devise suita technique and appliances which can effect and accommodate a larger population and probably by having two or more queens in a hive. This method will be only tentative until the results of the hybridizing and selection work are available.

(3) Appliances for the easy transit and distribution of bee packages and queens will be devised.

(4) Minor appliances similar to the 'Porter' bee escape, the drone trap, the swarm trap may be modified and tried.

(5) Queen rearing - Technique as well as appliances for rearing queens under the current economic possiblities of the Indian bee are available and the work may be pursued along with the advances in other directions.

(6) Promising and useful appliances will be standardized and made available for the public.

D. Bee enemies and diseases - (1) Enemies - Enough knowledge has already accumulated regarding the bee enemies occurring in this Presidence but a sharp look-out will be kept for the incidence of any new forms.

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(2) Diseases - The Indian bee has, so far, been reputed to be free from any diseases but complaints are occasionslly received from Madurai and a few other places wherein a high death-rate of the brood as well as the young bees have been reported, preliminary observations have gone to show that it is more due to the climatic factors than to any disease organism. The investigations may be continued.

E. Pasturage - (1) A fairly exhaustive list of the pasturage plants of south India is available and the line of work will be continued with details regarding the month of flowering, the status, etc.

(2) Studies made so far have shown that bee pasturage is the deciding factor for the success or otherwise of bee-keeping. It was also found that availability and collection of the bee-foods are influenced by certain climatic and weather factors like temperature, humidity, high winds, success of failure of the monsoon, etc., and some interesting data have been gathered. A continuation of this line of work, especially on the influence of these factors on the secretion of nectar will yield fruitful results.

(3) Determination of the actual quantities of pollen and nectar collected by individual bees of different varieties from different crops would provide experiemental data to correctly assess the working capacity of the bees and the status of the crops concerned.

(4) Pollen substitutes - During periods of dearth of pasturage, bee colonies stop breeding nd and consequently go down in strenghh. Of the two bee foods, nectar deficiency can be augmented by feeding with sugar or jaggery syrup but all our previous attempts to induce them to take to artificial pollen substitutes have not been ~~succ~~ successful. The European bee is reported to take a number of these substitutes. Any success achieved in this aspect would go a long way to solve one of the major problems of bee-keeping in South India.

F. Bees and Pollination - The importance of bees in pollination can probably be better evaluated in the case of fruit crops. This may necessitate the stationing of an assistant in the fruit-growing areas of the Presidency, probably at Kodur, exclusively for the work. Details of the work will be furnished when the scheme is initiated.

G. Bee products - The chemical and physical properties of ~~hon~~ honeys and different sources have to be thoroughly investigated and standards of Indian honeys fixed. A large scale propaganda of the improved methods of extraction and preservation of Rock Bee honey may yield fruitful results.

II. Propaganda - As the Coimbatore centre has been assigned the status of a Central Research Station, a certain amount of propoganda work also has ~~be~~ to be undertaken if it ~~si~~ is so stipulated. The lines of work will consist of :-

(1) ~~Hedin~~ Holding short courses for enthusiast.

(2) Arranging the supply of suitable appliances to interested parties.

(3) Arranging for marketing of the produce from large-scale bee-keepers, if necessary.

(4) Issue of popular publications, etc.

V. Venue of work - (1) Coimbatore will be the centre of research and the headquarters of the officer in charge

of the scheme. Important items of work such as crossing breeding, selection, observations on the foreign bees, etc., as envisaged in the programme of work will be conducted here. He will be assisted by a staff of two assistants and two fieldmen.

(2) Another assistant can be posted at Coonoor. A few colonies of the foreign bees and hill bees will be kept under observation there. The hives can be located at the Pomological Stations. Apart from general observations on the progress and habits of the bees, the importance of bees for pollinating exotic fruit trees will also be studied. He will have one fieldman to help him.

(3) One assistant can be posted at Kodur. He will maintain a dozen hives of Apis indica and study the influence of bees on the pollination and setting of Indian fruits. He will be helped by a fieldman.

(4) One Chemistry assistant can be entertained for a period of three years commencing from the third year of the inception of the scheme, to study on the physical and chemical qualities of honey. He will work at Coimbatore and will be assisted by an attender.

VI Staff - The scheme will run for a period of five years under the entire control and guidance of the Government Entomilogist, Coimbatore.

(2) Officer in charge - An officer of the status of the Madras Agricultural Service will be in charge of the scheme. In view of the peculiar mating habit of the bee the possibilities of cross-breeding lie only in artifical insemination. This is a highly specialized art and the services of an officer of high competence and professional skill of a superior order are necessary. He should be a good Entomologist with sufficient experience in bee-keeping first and should also possess a fundamental knowledge of geneties and breeding technique. He should have a first hand experience of the latest methods of bee-keeping, bee-breeding and artificial insemination in the Western countries. The post may therefore, be advertised and a really capable hand recruited, if necessary on higher initial start.

(3) Subordinate staff - Five assistants and four fieldmen as detailed below will be required for the scheme:-

Coimbatore :--

ficer in charge of the Scheme.

o assistants.

o fieldmen.

e Chemistry assistant for a period of ree years from the third year of he scheme.

e attender

e clerk.

One peon.

Kodur:--

(1) One Assistant.

(2) One fieldman.

Equipment - The following are the equipment necessary by way of bee-colonies, appliances, coolie labour, etc.:--

The present stock of bee-colonies in working condition and the appliances with the Department of Agriculture at Coimbatore and Coonoor can be conveniently transferred to the scheme

The additional equipment would be as follows:--

One dozen foreign bee-colonies.

Appliances for the same.

Sheds at Kodur and Coonoor.

One dozen hives for Kodur and appliance.

VII. The financial implications are furnished below:--

Financial statement for the proposed bee-keeping scheme.

Coimbatore.	I Year	II Year.	III Year.	IV Year.	V Year.	
Officer in charge at Rs. 230 in the scale of Rs. 230-30/2-260-40/2-500-50/2-700.	2,760	2,760	3,120	3,120	3,600	
Two Assistants on Rs. 10 in the scale of Rs. 100-5-140-10-220.	2,400	2,520	2,640	2,760	2,880	
Two Fieldmen on Rs. 45 in the scale of Rs. 45-2-55-1-60.	1,080	1,128	1,176	1,224	1,272	
One Chemistry Assistant on Rs. 100 in the scale of Rs. 100-5-140-10-220 from the III year of the scheme.	..	1,200	1,260	1,320		
One Laboratory attendant on Rs. 19 in the scale of 19-1-32 for the chemistry Assistant.	..	228	240	252		
One clerk on Rs. 45 in the scale Rs. 45-3-60-2-90.	540	576	612	648	684	
One peon on Rs. 16-1-2-24.	192	198	204		216	
	6,972	7,182	9,180	9,462	10,224	43,020

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Coimbatore (contd)	I Year.	II.Year.	III Year.	IV Year	V Year.	
Dearness Allowances						
Dearness Allowance for officer-in-charge.	552	552	624	624	706	
Dearness Allowance for two assistants.	576	624	648	672	696	
Dearness Allowances for chemistry Assistant.			288	312	324	
Dearness Allowances for ~~chemistry Assistant~~ Laboratory Attendant.	..	..	216	216	228	
Dearness Allowance for clerk.	264	64	264	264	264	
Dearness allowance for peon.	216	216	216	216	216	
Dearness allowance for two fieldmen.	528	528	528	528	528	
Dearness allowance at the rates santioned in G.O.No. 99, Finance dated 29th January 1948.	2,136	2,184	2,784	2,832	2,964	= 12,900
Coonoor -						
One Assistant on Rs. 100 in the scale of Rs. 100-5-140-220.	1,200	1,260	1,320	1,380	1,440	
One Fieldman on Rs. 45 in the scale of Rs. 45-2-55-1-60.	540	564	588	612	636	
	1,740	1,824	1,908	1,992	2,076	9,540
Dearness allowance for Assistant.	288	312	324	336	348	
Dearness allowance for fieldman.	264	264	264	264	264	
	552	576	588	600	612	= 2,928

	I Year	II Year	III Year	IV Year	V Year	
Kodur -						
Details regarding staff same as Coonoor -						
Total under pay of establishment for the five years.	1,740	1,824	1,908	1,992	2,076	
Total under dearness allowance of staff.	552	576	588	600	612	
Hill allowance for the staff at Coonoor- Hill allowance for assistant	270	270	270	270	270	
Hill allowance for fieldman.	162	162	162	162	162	
	432	432	432	432	432	= 2,160

Contingencies:-

		Rs.
Recurring -		1,080
Coimbatore 2 collies at Rs. 45 per month.	..	1,080
Coimbatore one boy at Rs. 20 per month	..	240
Coonoor one colie at Rs. 45 per month	..	540
Kodur one coolie at Rs. 45 per month.	..	540
Other miscellaneous contingent expenditure coimbatroe centre		1,000
Coonoor and Kodur each at Rs. 400		800
		4,200

Non-Recurring:-		Rs.
One dozen foreign bee-colonies		2,000
Appliances, etc.		2,000
Shed at Kodur and Coonoor.	..	400
One dozen hives for Kodur and other appliances.	.	500
	Tota	4,900

Travelling allowances -

At Rs. 1,500 per year for five years.

ABSTRACT OF EXPENDITURE FOR THE BEE-KEEPING SCHEME FOR FIVE YEARS.

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Non-recurring at Rs. 4,900.

		Rs.
Recurring -		
Pay of establishement (including officer in charge)	..	62,106
Dearness allowance of establishment (including officer in charge)	..	18,756
Hill allowance for staff at Coonoor	..	2,160
Travelling allowance for entire staff.	..	7,500
Contingencies	..	21,000
		1,11,516 or 1,11,520.

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SUPERINTENDENT

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Madras Record Office.

20/6

Development Department.

Letter Ms. No. 4124 Dated 9-8-1948.

To

The Secretary to the Indian Council of
Agricultural Research,
New Delhi.

Sir,

Sub: Agriculture - Indian Council of Agricultural Research - Scheme for the establishment of Bee Research Stations - Forwarded -

Ref: Your letter No. F. 8(5)/47-A.H. dated 19-2-1948.

I am directed to forward herewith a scheme for the intensive study of honey bees, to be run for a period of five years. The scheme envisages the establishment of a Central Research Station at Coimbatore with two regional stations. The scheme is estimated to cost Rs. 1,11,520 recurring for five years and Rs. 4,900 non-recurring. It is proposed to share the recurring expediture equally between the Indian Council of Agricultural Research and the Provincial Government and the non-recurring expenditure will be entirely borne by the Provincial Government.

I am to request that the sanction of the Council may kindly be obtained and communicated to the Government at an early date.

(Sd) .....
24.7.48.

Copy to the Director of Agriculture.
He is requested to submit usual printed copies of the scheme for forwarding to the Indian Council of Agricultural Research at a very early date.

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Madras Record Office.

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